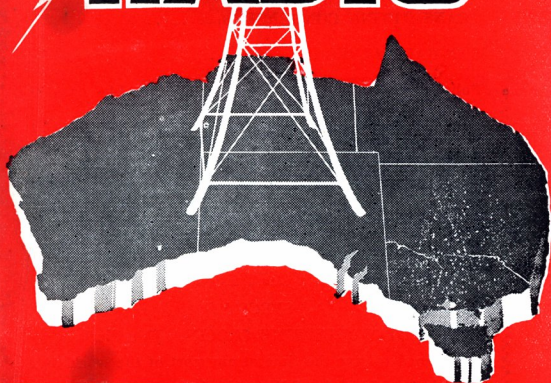


AMATEUR RADIO



Published in the interests of the Wireless
Institute of Australia, Official Journal of all
divisions of the W.I.A. and R. A. W.R.



PRICE

6^p

OCTOBER, 1938

HAMS

SUPPORT YOUR ADVERTISERS.

T.C.C. CONDENSERS

8 mf. Type F.W. Electrolytics 3/6 (N)

8 mf. Type 606 Electrolytics, 460v. 4/6 (N)

TRANSMITTING CONDENSERS (D)

KEN-RAD VALVES (O)

Polished Carbon Granules 14/- oz. (O)

Webster Pickups £4/10/- (U)

5/8in. Birnbach Insulators 1/- each (T)

1in. Birnbach Insulators 1/4 each (T)

.1 mf. Stedipower Moulded Cond. 1/- (N)

Brano Velocity Mikes £10/10/- (O)

SPECIAL.

SKY PILOT WORLD TIME CLOCKS. This Clock is designed to give the time at any part of the world at a glance. Ideal for S.W. enthusiasts 45/- net

SAME DAY MAIL ORDER SERVICE.

First Obtain Our Quote on Your Condenser Requirements.

A.E.E. Co. Pty. Ltd.

370 LITTLE COLLINS STREET - - - - MELBOURNE

Phone: F5585.

(Next Door Wattle Tea Rooms)

AMATEUR RADIO

Published by the Wireless Institute of Aust., Victorian Division.

Vol. 6 No. 10

1st OCTOBER, 1938.

INDEX

Editorial	3	An Efficient CW-Phone Trans-	
Power Tuning Condensers for		mitter for Four Band Operation	13
"Ten" and "Five"	4	VK3MR DX Notes	17
Q.S.L. Bureau	7	28 and 56 M.C. Notes	18
VK3IR's Antenna Tower	8	Divisional Notes—	
Obituary	10	N.S.W.	19
Power Supply from Low Voltage		Victoria	20
D.C.	11	Queensland	22
Correspondence	12	South Australia	24
		Tasmania	26

Divisional Addresses:-

FEDERAL HEADQUARTERS BOX 2127L, G.P.O., SYDNEY
NEW SOUTH WALES BOX 1734JJ, G.P.O., SYDNEY
VICTORIA BOX 2611W, G.P.O., MELBOURNE
QUEENSLAND BOX 1524V, G.P.O., BRISBANE
WEST AUSTRALIA—
ROOMS 2 & 3, MELBA CHAMBERS, Cor. HAY and MILLIGAN
STREETS, PERTH.
SOUTH AUSTRALIA BOX 284D, G.P.O., ADELAIDE
TASMANIA BOX 547E, G.P.O., HOBART

Magazine Committee:-

Editor—W. R. GRONOW (VK3WG).
Technical Editor—R. H. CUNNINGHAM (VK3ML); Notes—C. SERLE (VK3RX);
Compilation—V. E. MARSHALL (VK3UK);
Secretary—T. POWERS (VK3PS)

All Communications and MSS. should be forwarded to the Editor, "Amateur Radio," BOX 2611W, G.P.O., MELBOURNE.

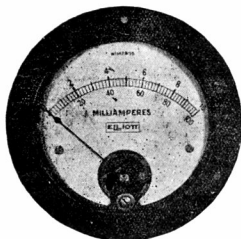
Subscription to "Amateur Radio" is 6/- per Annum (Post Free), paid in advance.

Should you not receive your copy of "Amateur Radio," notify your Divisional Secretary at once.

Advertising and Publishing Office: Address Publicity Manager, "Amateur Radio," Whitehorse Road, Box Hill, E.11. 'Phone: WX 2429.

NOTE.—ADVERTISERS' CHANGE OF COPY MUST BE IN HAND NOT LATER THAN THE 20th OF THE MONTH PRECEDING PUBLICATION.

Submit Your Instrument Problems to us



SIEMENS ELLIOTT INSTRUMENTS

For Every Requirement

SIEMENS (Australia) Pty. Ltd.

**SYDNEY MELBOURNE BRISBANE ADELAIDE
NEWCASTLE**

H. G. Little & Co. Perth: W. & G. Genders Pty. Ltd. Tasmania

Agents for THE ENGLISH ELECTRIC CO. LTD., LONDON.



EDITORIAL

The other day we heard it said that the average Australian Amateur has no opportunity of "doing something" for his hobby. We place the words "doing something" in inverted commas because the phrase is delightfully vague even if the inspiration behind it is laudable. Further questions elicited the facts that "doing something" seemed to be irrevocably tied up with earthquakes, floods, hurricanes, etc. This was interesting because we have never felt that the active co-operation of Mother Nature was essential for us to adequately serve our Hobby. No! Our friend was not a member of the W.I.A. How could that alter the question, we were asked. To quote only one reason, did he know that the W.I.A., and, through it, its members, contributed towards the expenses of the Amateur Delegation to the Cairo Conference? Surely by not being a member he let an opportunity of serving his Hobby slip by.

Last week the Ham world suffered a terrible loss in the tragic death of Ross Hull. Known and respected throughout the Radio world, he was regarded as one of the foremost experimenters of the day and typified all that is best in Ham Radio. An ex-Federal and Victorian Division President, our Hobby is the better for his contact. It is men of his calibre who, through their association with organised Amateur Radio, have improved, not only the technique but also the co-operative Spirit of fraternity existing to-day amongst Amateurs the world over. He was the pioneering Spirit that admitted no failure—

experimentation was in his blood. He "did something" for Amateur Radio day by day—may his example be an inspiration to us all.

During the last weeks the international tension has increased, and the world is anxiously awaiting the results of Britain's efforts in the cause of Peace. Should war come, we fervently pray it will not, Australia will need operators — good operators. The man who takes a pride in his fist, who has consciously tried to improve both his speed and accuracy is a man who will be of inestimable value. The "wise guy" who so proudly announces that he "hasn't a key in the shack" will not only be useless, from an operating standpoint, but also a menace to the good name of Amateur Radio. For those who wish to train themselves to be ready to serve their country through their Hobby the R.A.A.F. Wireless Reserve will train them in Service procedure, in addition to helping them improve their operating ability, so that in a time of national emergency they will be immediately available.

There are hundreds of Amateurs who are daily "doing something" for Amateur Radio; to the others it may be said, "Opportunity is half the battle, but the ability to seize it is the other half." It is up to you.

Power Tuning Condensers for "Ten" and "Five"

(By E. H. Cox, VK2GU.)

Design of the output circuit of a high frequency amplifier for power applications involves a compromise between a variety of conflicting factors. The attainment of the best possible efficiency involves the use of as high an impedance as is practically procurable in the tuned circuit into which the valve or valves operate. This in turn, involves the use of high driving power. High plate impedance, even in practice, is comparatively easily obtainable by the use of a high ratio of inductance to capacity in determining the oscillation constant of the plate tank circuit, and if these factors were the only ones involved in the design of an output circuit the job would be comparatively simple. No tank tuning condenser would be required, and the circuit could be resonated by the employment of an appropriate variable inductance operating in conjunction with its own distributed capacity, and the accidental additional distributed capacity introduced by other circuit components, all of which, of course, would be built to reduce their capacity to a minimum.

Unfortunately, there are other limitations which prevent the use of such a circuit as an amplifier tank, particularly when the tubes are operated under the highly biased Class C conditions of to-day. These arise from the lack, in an "all inductance" tank of the necessary "fly-wheel" effect to sustain the normal oscillation of the tank circuit current over the portion of each cycle in which the tube itself is biased beyond cut off. In a single ended Class C amplifier the tube conducts and imparts power from the DC plate supply to the tank circuit for only a fraction, the size of which depends on the fixed grid and plate pressures on the tube and its amplification factor of each cycle. During this short conducting period, the tank circuit must acquire, and store, sufficient

power, not only to carry it over the hiatus of DC current flow, but also to impart energy to the antenna or other load during the same period. If it fails to do so, the currents in the output circuit will differ materially in wave form from those impressed on the grid of the tube. Efficiency will suffer and there will be a sharp rise in the harmonic content of the output from the system. The position is materially improved if the amplifier employs tubes connected in push pull. Then, instead of one DC energising impulse per cycle there will be two pulses, the peaks of which will occur at diametrically opposite points on each cycle. A marked improvement of wave form will thus result, but even the push pull stage requires a certain minimum ratio of capacity to inductance for a given frequency, below which minimum it is impossible to go without deterioration of the output wave form. The minimum value of capacity to be employed in a tank circuit for a given frequency will vary with the conditions of operation of the tube. For instance, the higher the grid bias for a given tube operated at given plate voltage and fixed driving power the shorter will be the period of plate filament conduction in each cycle, and the greater the storage capacity needed in the tank circuit. Other conditions being the same, the required storage capacity tends to rise as plate voltage is reduced, and current kept constant, and to fall as the voltage is raised for a constant current. Conversely, if the anode voltage is kept constant, and the current is varied by coupling adjustments, the minimum necessary value of tank capacity will rise as the current rises, and fall as the plate current is reduced. It follows from this that constants optimum for a given tube at one set of values of plate current and pressure will in general not hold if these are varied, and also that, in general, the constants for a low impedance tube operated at

moderate pressure and high plate current will be very markedly different from those for a high impedance tube operated at high voltage and relatively low space current.

The flywheel effect in the tank circuit can be given numerical expression as a ratio of the volt amperes in the tank circuit to the power delivered by the tube, and it is called the operating Q of the circuit. Although it is nearly always permissible and safe to use a lower value of Q when an amplifier is to be used for telegraphy only than when it is to be modulated, general practice has become to design the circuit so that the value of Q is approximately 12. By making the value lower the tank capacity is reduced, and the impedance of the circuit is increased for a given frequency of oscillation. Provided that this reduction is not carried too far, a small resultant rise in plate circuit efficiency can then be obtained without the generation of objectionable harmonics.

The relationship between the circuit constants in a conventional single type Class C amplifier can be expressed for normal Class C operation as follows:—

$$C \text{ equals } \frac{QI}{3.14E}$$

where C is the total capacity across the tank coil in microfarads Q is the numerical expression of the "flywheel" effect, f is the frequency in megacycles, I is the DC plate current in the stage in amperes, and E is the DC voltage applied between anode and filament. Any pressure from the power supply dropped across a cathode biasing resistor must not be included.

Since the capacity required if the amplifier is push pull is one quarter that needed when the stage is "single ended" and conventional the necessary value can easily be obtained by dividing the solution of the above equation by four. By assigning the optimum value of 12 for Q , it becomes easy from this equation to determine the necessary value of C for a given frequency under known conditions of tube loading.

Results of very considerable interest follow the application of the equation to representative tubes

operated at the maker's ratings on the ten metre band. For instance, a pair of 807's operated in push pull with an effective plate voltage of 600 and a total plate current for the two tubes of 180 milliamps would require about 9.5 micromicrofarads total tuning capacity across the plate tank. If the tubes were 809's operated at 750 volts, and 200 mills total plate current, the capacity value required would be just over 8.5 micromicrofarads. For a pair of 800's with 1200 volts on the plate and a total plate current to the amplifier of 140 mills, the necessary value of C becomes 3.75 micromicrofarads.

Notice also that in the equation C represents the total value of capacity in the circuit, not merely that in the tank condenser. The 807 has an output capacity of 7 micromicrofarads to start with. Thus in push pull, a pair would contribute an effective capacity of 3.5 micromicrofarads to the circuit before any condenser was included. The distributed capacity of the tuning coil itself, leads and even the neutralising equipment, if any were used, would add a bit more, so that the value of plate tank capacity actually required would be considerably less than the total value of 9.5 micromicrofarads given by the equation.

In the case of the high impedance 800's it is quite clear that the tank tuning condenser is required to add very little capacity to the circuit. Notice also that if the frequency of operation was 56MC instead of 28MC, these values would become just half those quoted. In such a case, it is evident that the main job of the designer should be to eliminate distributed capacity to reduce its value to something approaching the optimum. In such a case, the tank condenser becomes merely a convenient mechanical device for adjusting the resonant frequency of the system, and unless it is made extremely small the effect of the tank condenser capacity on the electrical efficiency of the circuit would be disastrous.

Next let us look at the characteristics of the tank tuning condensers commonly used on amateur bands. Not many manufacturers are as informative as they might be, but one or two have helped. One big Ameri-

can manufacturer making tank condensers typical of those in general amateur use, discloses that his dual section 50 micromicrofarad condenser has a minimum capacity between the two fixed sections of about 12 micromicrofarads. This figure is in good agreement with the published minimum capacity figures for a leading English made tank condenser, and it may be assumed that it is fairly representative. The implication from this figure is an illuminating commentary on the reason why so many people fail to get a really satisfactory no load plate current dip in the final of a ten meter transmitter. The condenser is so large that, even before its plates are meshed, and before any allowance is made for tube capacity or circuit distributed capacity, its minimum capacity is above even the optimum for the most obliging tube set up—the very low voltage high current beam power 807. The minimum capacity is very nearly three times greater than the optimum for the push pull 800's under the operating conditions mentioned on ten metres. In view of the figures quoted, it seems superfluous to discuss the suitability of such a tank condenser for a five metre rig, particularly when it is born in mind that the irreducible values of minimum distributed capacity in other components will not be appreciably lower on five metres than on ten, and whether operation is on five metres or ten, the conclusion is inescapable that the conventional tank condenser is not the ideal tuning unit for such an amplifier.

There is, fortunately, an excellent substitute for the conventional condenser. That is the simple disc type of neutralising condenser so widely used on all forms of transmitters. Once the point is appreciated that a push pull transmitter does not of necessity require a split stator tank condenser, the advantages of the disc neutralising condenser as a high frequency tank are obvious. Provided that the grids of the stage are driven by a set up involving the use either of a split stator, grounded framed tuning condenser, or a grid tank with a high frequency earth connection at its centre point, the use of a big split stator plate tank condenser on 28 or 56 mc is not merely not necessary, but actually undesirable. The disc

type neutralising condenser, on the other hand, is admirable. It is physically extremely small. It has much less insulating material in or near the field than any ordinary tank condenser. Its minimum capacity is extremely small, and its maximum ample, when used in conjunction with tube capacity and circuit capacity, for tuning any of the tube pairs mentioned, or any others we can think of on either ten or five metres, and it has the further advantage of an inbuilt, natural semi vernier adjustment. Moreover, it costs very much less than a high voltage condenser of conventional design.

We first appreciated the merits of the disc type neutralising condenser when we use one experimentally in a five metre final. Previously a 7,500 volt Hammarlund condenser had been used, but when this big job was in the transmitter it was impossible to obtain an encouraging plate current dip, and whenever a dip could be obtained, the heavy aluminium bars of the condenser became warm, and copper tank coil actually blued with heat after a run of more than a few minutes. When an Eddystone type 1067 neutralising condenser was substituted, it became necessary at once to more than double the value of tank inductance to strike resonance. The plate current dipped magnificently and everything remained perfectly cool, except the 12 gauge wire tank coil, which, without aerial, became warm, but not hot. This heating disappears when the antenna load is applied.

A little calculation then showed that the same condenser would provide ample capacity for the 10 metre circuit, and it was installed there also. The improvement, although less marked than on five metres, was still quite profound and the rise in plate efficiency was so great as to leave no doubt that the Hammarlund condenser was not comparable with the neutralising condenser for this service. Although we used the larger of the two Eddystone disc types, the smaller (No. 1088) would undoubtedly serve even better for any five metre transmitter within amateur reach, using a push pull final and on 28MC it would unquestionably have a sufficient voltage rating for any tubes up to 808's operating

at maker's rated input. Also, it is much cheaper than the larger type.

A surprising result of the installation of the two pole neutralising condenser in the plate circuit was a marked improvement in the neutralisation of the stage. The set up always had employed a small, split stator grid condenser through the earthed frame of which the stage was balanced for neutralising. When the split stator Hammerlund was used in the plate tank neutralisation was never dead perfect, and a readjustment, moreover, was required when changing from 28MC to 56MC. It is, therefore, concluded that although of the split stator type, either one, or both of these condensers were not perfectly symmetrical. Though the frame of the Hammarlund was floating its capacity to the transmitter chassis was nevertheless considerable, and the asymmetry in the condensers evidently produced an ill defined earth point—virtually the equivalent of two separate earth points on the stage, which made precise neutralising impossible. The smaller plate tank, with greater real symmetry and negligible capacity to earth, completely eliminated this trouble, and neutralisation immediately became perfect, and fixed for all bands when it was employed.

Everything so far written has assumed the use of a push pull stage. For the reasons mentioned at the outset the capacity required on a single ended stage would be four times greater than that needed with the stage is push pull for given values of plate and grid current. Referring back to the examples quoted, and assuming the same late voltage, but half the plate current mentioned above, since only one tube would be used, the proper capacity values for the ten metre band would become about 19 mmfds in the case of the 807, 17 mmfds in the case of the 809 and 7.5 mmfds for the 800. In the first two cases the values lie within the limits which could be reached at the minimum setting of a small, single ended condenser of conventional design, and they are probably a little too high to be reached with a disc type neutralising condenser unless the plates were set so close that the danger of flashover would arise. But in the case of the 800, which is typical of that of a single 100TH, 808, 35T or any of the new high im-

pedance tantalum plate tubes, it is quite evident that the conventional condenser is too big, and the disc type neutralising condenser again provides the answer. On five metres, the neutralising condenser will undoubtedly be far superior to the conventional type for all the tubes in ordinary amateur use.

QSL Bureau

R. E. Jones, VK3RJ, Qsl. Manager.

FB8AB advises through VK3EV that a "Maroon is using the callsign of VK4FR." As VK4FR is not issued, anyone who has worked that callsign has the consolation of knowing he has worked Africa, but unfortunately it won't do for WAC.

A big bunch of cards is to hand from HH3L. Lanoix says he wants absolutely to send his qsl to all the VK's he has worked since two years.

Alf Chandler (VK3WH) is back at his old address in Beaumaris, which he left in 1928. Alf has had the old sticks renovated and heightened, and adorns them with an antenna of two half waves in phase. Excited by a Taylor T55 this ant. is bringing good reports from Europe, North America and Asia. Needless to say, Alf is pleased.

Tom and Jock Speer, VK3TS and VK3FF respectively, have been engaging in a xtal puncturing competition. Tom blames Jock and Jock blames Tom. According to the latest scores Jock is one rock ahead.

Loud and sustained walls come from ZL anent the Qrm from VK fones on 14mc, according to recent issues of "Break In." Have it how you like nothing is surer and not so far distant than the segregation of phones to allotted frequency bands.

Fritz Haas, OE1FH, expects shortly to emigrate to Australia. Fritz is a graduated civil engineer, and speaks and writes English like a native. Anyone having anything to offer in the way of employment in road construction, water conservation, bridge building, large scale concrete construction of allied schemes or who can put the writer in touch with any corporation or firm requiring the services of a highly qualified engineer please communicate with the writer.

VK3IR's Antenna Tower

3IR's antenna poles had always been a source of worry, so after diving into books, mags, etc., looking for dope the following was discovered. Now this mast, or should I say tower, is by no means original, the idea originated from an American engineer and ham. Besides being highly efficient, through lack of stays and guys it is a sound cheap investment. Everyone knows that a high efficient antenna is one of the greatest assets to any ham rig. Now the tower to be described can be made any height, but the one constructed was 65 to 70 feet. Reports from ZL2 and W indicate that a very satisfactory signal was radiated from our new antenna.

The Yank tower was constructed of 2 in. x 2 in. soft wood and was 100 feet high! We decided that 80 feet was sufficient for our requirements, both from a radio point of view and from a safety one. The idea now is to get four pieces of 2 in. x 2 in. Oregon 20 feet long and lay them out on the ground in one straight line. Now to join them just place four 1½ inch laths over each of the four surfaces of each join and nail securely; this may sound a very feeble way to join timber for a tower of such height, but it is quite secure when all the tower is nailed together. Any other method could be used of course, but this was the method used by the Yank, and that which we used. The joints have proved quite secure as in reality no weight is placed on one but on the four together.

Now get four more pieces of 2 in. x 2 in. Oregon and do same as above, as is done with two more lots of four pieces of 2 in. x 2 in. Oregon. Now you have four pieces of Oregon 80 feet long each laid out side by side, they may look like a distorted sine wave but don't worry.

Now getting four pieces of oregon 1 in. x 3 in x 1 ft. 6 in. long we cut them up to make a square approximately 1 ft. 6 in. x 1 ft. 6 in. Two of these 1 ft. 6 in. squares are made and are placed 5 feet each side of the

centre. Now nail securely one of the 80 ft. lengths on each of the two sides at the corner, making what looks like a box kite in the middle section, these 1 ft. 6 in. squares will now of course be 10 feet apart.

At each end a square of the same thickness Oregon only 6 in. square is nailed in securely, making what looks like (from a side view) a big long diamond shaped frame work. More squares are made and nailed



in every 5 feet towards the main two 1 ft. 6 in. squares which we already have installed in the middle section of the tower.

Quite a quantity of 1 in. or 1½ in. lathes are now procured and are nailed to the outside of the tower to make a square of the outside or should I say a square around the outside. These are nailed at spaces of every 18 inches. When this is completed it will be ready for the cross laths to be nailed. Care should be taken to see that the tower is stretched out on a flat piece of ground and that each end is lifted

with blocks to make it straight. The middle section is left on the ground and each end will have to be blocked up to about 6 to 9 inches off the ground to give the pole the correct bend. The pole is, of course, 6 inches square at each end and the middle section is 1 ft. 6 in. square. **THE MOST IMPORTANT POINT TO ALWAYS REMEMBER is that ALL YOUR MEASUREMENTS MUST BE CORRECT.** If a lathe is split then pull it out and replace it.

At this present juncture you have a tower looking like a ladder with lath steps every 1 ft. 6 in. and tapering from the bottom 6 inches to the middle 1 ft. 6 in. and then tapering back again to the top at 6 inches. This will, or should, or **MUST** look alike from all four sides. Now each of the spaces between each step is covered with a cross made of laths. The idea is better obtained from the photograph of 3IR's tower.

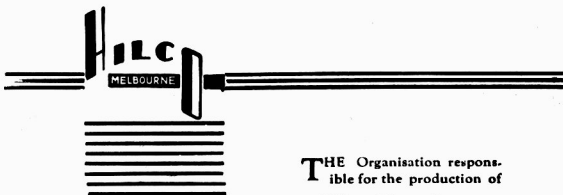
Guy wires! Yes, we do have some, but only four are required (the four guys are connected to the centre section of the tower). These are to be

strong wire and strain insulators are to be inserted every few feet. This tower if properly constructed will definitely not bend in the middle when being put up in the air, the stays are only to hold it up in the air, not to keep it straight when it is up. So have no fears of it bending—it was designed with the centre portion thicker than the ends for that purpose.

The tower made by 3IR was constructed of 1 in. x 1 in. Oregon and 1 in. laths, but is not recommended unless very well made.

A good crew is required to pull it up as no doubt it will be heavy, but will be substantial. Block and tackle is recommended, but in its absence at 3IR brute force was used, this being supplied by fellow hams and commercial ops. from the Navy Depot.

Inspection is invited and 3IR would only be too pleased to offer any further dope to anyone who cares to write or call.



*The Power
Equipment with a
Powerful
Reputation*

THE Organisation responsible for the production of

**Hilco Transformers
Chokes etc.**

has proved its high standards for an article of extreme merit as accepted by the largest consumers in Australia.

All Products Guaranteed for twelve months.

Hilco Transformers Proprietary Limited

97-111 Berkeley St, Carlton N.3, Vic. Phones F 1661-2
CABLES & TELEGRAMS "HILCOY" MELBOURNE

Ross Hull

Every VK Amateur will learn with deep regret the passing of Ross Hull, ex 3JU, of Melbourne, Australia.

Ross proved an enthusiastic experimenter in the early days of radio after the War. His activity and influence in the Victorian Division of the Wireless Institute of Australia did a great deal to build up the spirit and encouraged those young men who experimented with then a new art for the pure love of the game.

It can be fairly claimed that Ross was the first member of the Wireless Institute of Australia to discuss before the Institute, Radio Frequency Amplification. His energy and aid were largely responsible for the successful conclusion of the original Transpacific Tests in 1922.

His untiring devotion to the experimental field soon resulted in his abandoning his career as an architect and his being absorbed entirely in experimental work and the publication of vital information to the vast body of experimentally minded men throughout the world.

Unfortunately, the services of Ross Hull were lost to Australia, but the United States of America—indeed the whole world—benefited by his activities in association with the Amateur Radio Relay League and its monthly publication, the Amateur Bible Q.S.T.

A deep thinker, a likeable personality, has lost his life while engaged in the work he loved.

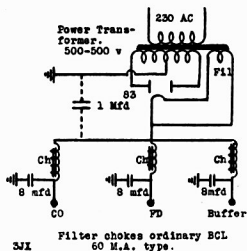
I write on behalf of every Amateur in the Commonwealth when I express the deep regret of the members of the Wireless Institute of Australia and all Australian experimental amateurs.

To his mother and his relatives,
we Amateurs desire to convey our
deepest sympathy on behalf of Aus-
tralian experimenters.

H. KINGSLEY LOVE,
VK3KUL

Lowering Filter Choke Costs

The following diagram was omitted from VK3JK's article in Page 23 of the August issue:—



Trackson Bros. Pty. Ltd

QUEENSLAND'S LARGEST COMPONENT HOUSE.
HAVE STOCKS OF ALL HAM REQUIREMENTS.

Including

**Brimar Valves.
T.C.C. Condensers.
I.R.C. Resistors.
Ever Ready Batteries.
Triplett Meters.**

Raytheon Valves
Ducon Condensers
Amplion Speakers.
Clyde Batteries.
Radiokes Products

TRACKSON BROS. PTY. LTD.

157 ELIZABETH STREET, BRISBANE.
(At Rear of Regent Theatre)

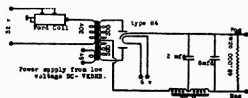
Power Supply from Low Voltage D.C.

The power supply being used at VK5HR probably will be of interest to those amateurs who are handicapped by having nothing but low-voltage D.C. for power supply. It can be operated either from a 32v. house lighting supply or a 6v. battery.

The power transformer was specially built for the job by a well-known Sydney firm. It has a 5v. and also a 30v. primary and delivers 300v. at 100 mills from each side of the centre-tapped secondary. The transformer is constructed on the same lines as any ordinary power tranny, and could be easily built up by the average amateur. Anyone building their own would be well advised to use about 10 turns per volt on both the primary and the secondary.

The interrupter used is the ordinary Ford coil. For use with a 32v. supply the interrupter is connected in series with the 30v. winding on the transformer and the secondary of the Ford coil is left open circuited. When the arrangement is used on 6v. the coil is connected in series with the 5v. winding and the secondary is short circuited. Contrary to expectations, the sparking at the contacts is very slight, and over 150 stations were worked before the trembler blades needed replacing.

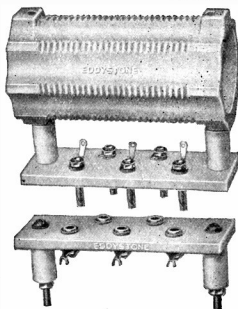
The rectifier used is an 84, and the filter is the ordinary brute-force type. The 84 has proved to be a



wonderful little rectifier, and has stood up well to an almost continual overload.

(Continued on Next Page.)

. . EDDYSTONE . . FREQUENTITE TRANSMITTING COIL FORMER. — A NEW RELEASE —



A Frequentite ceramic former for transmitting and other high frequency apparatus. The former is 5in. x 2½in., and may be mounted as illustrated, or on Frequentite pillar insulators. Spiral grooves take 26 turns of wire up to 12 gauge; 14 holes are provided for leads and tapping connections. Each former is supplied with winding data for Amateur frequencies, and is designed for coils up to 90 metres.

Coil Former, No. 1090 7/- nett
Frequentite Base, No. 1091, 6/9 nett
Frequentite Sub-base, No. 1092, 6/9 nett.

An illustrated catalogue of all the Eddystone lines is available free from all Eddystone distributors, or from

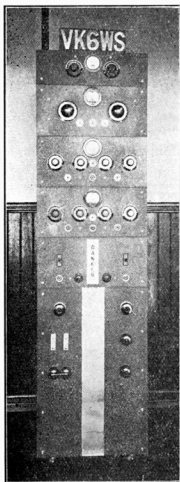
R. H. CUNNINGHAM & CO.
94 ROBINSON ROAD, HAWTHORN, E.2.

Correspondence

Experimental Radio Station
VK6WS,
40 Irvine Street,
Peppermit Grove, W.A.
6th September, 1938.

The Editor, "Amateur Radio,"
Melbourne.
Dear Sir,

In the June issue of your magazine, "Air Raider," in his notes, implies that I am adopting the American nasal twang in my transmissions from VK6WS.



I am a Yorkshireman, but have been out here thirty years and fortunately, or unfortunately, I still retain some of the Yorkshire accent. I have never made any attempt to alter my mode of speech, and at my age (64) I have neither the time nor the inclination to try to do so, and I have been picked out by hams in

other parts of the world as a Yorkshireman.

Now for a little growl on my part.

There are several matters to which Australian transmitters can give attention, one of which is the calling of the CQ signal on phone. One often hears a VK calling CQ twenty or thirty times before announcing his call sign. This is only a waste of time on his part and also wasting the time of the man who is looking for a contact. The regulations regarding calling CQ are plain and definite.

Some hams seem to think they are junior broadcasting stations when they announce "This is VK—the voice of Woop Woop" or something similar and it is the same class of station that puts on canned music and says that he is testing. All his testing could be done in a few minutes with his phone modulation instead of being a nuisance to other genuine experimenters.

I often wonder why some transmitters, when using phone say "Hi Hi" instead of laughing naturally if something amuses them.

The term "Old Timer" when applied to the other fellow can be forgiven, but to finish an over by saying "Take it away" seems to me particularly senseless.

I enclose photos of my transmitter (which I built myself) and operating bench which may interest you.
Yours etc.,

WM. SCHOFIELD.
VK6WS.

(Continued from previous page.)

The rig used here consists of a 42 tri-tet C.O. anda 201a link coupled P.A. Together with the vibrator power supply this rig has been in constant use since July and nearly 200 qsos have resulted — many of them D.X.! The QRI reports have nearly all been T9, and reports of R6 have been obtained from U.S.A. with only 6 watts input.

Taken all round, the outfit described above has proved very reliable, and also very economical, and we sincerely hope that anyone building up a similar power supply will be as well satisfied as we are.

An Efficient CW-Phone Transmitter for Four Band Operation

(By E. B. Ferguson, VK2BP.)

It consists of only four stages, requires only two power supplies to operate it, one 385/385 100 m/a, and one 600/600 250 m/a. transformer supplying the necessary energy for 15 watts output on 'phone and upwards of 40 watts output on C.W. It operates on the 80, 40, 20 and 10 metre bands from one suitable crystal, or it may be operated as a "self excited" rig of the "Electron-coupled" oscillator variety. The extra few pence and the little extra trouble in incorporating the latter feature are well worth while. Often it is desirable to change from one end of the band to the other.

The circuit, as will be noticed, utilises "suppressor grid modulation," which, whilst costing far less than would a system of "plate" modulation, operates more economically and has the desired effect of fully modulating the carrier. The modulated amplifier is followed by a linear amplifier stage, consisting of a pair of the popular 46 tubes in push-pull, the input to which, under telephony conditions, is approximately 30 watts, and it is possible with cw to operate these tubes with inputs up to 75 watts or even more.

Taking the circuit. The oscillator it will be noticed, follows the more

or less conventional "Tritet" lines. The grid circuit (L1-C1.) should be of "High C," having, preferably, a frequency range from about 3mc. to 8 mc. A suitable combination of inductance and capacity is given in the table. This is mainly to ensure stable operation when the oscillator is being used as a self-excited unit. If it is only desired to make use of crystal control, the ratio of C. to L. may be lowered to suit components on hand. To change from "Xtal" to to change over the D.P.T.T. switch (S.1) and re-tune the condensers.

Passing to the frequency doubling or multiplier stage, the only departure from the conventional is found in the cathode circuit. Although to all intents and purposes the circuit appears to be a straight forward non-regenerative amplifier, it is, in truth, highly regenerative, especially at 28 mc. This regeneration being particularly desirable for improving efficiency and output on the higher frequency bands. The regeneration is obtained by a proper choice of resistor at R3, and its by-pass capacitance C5, the effect being an ultra-audion action within the circuit. An aid to this desirable effect on 28 mc is to use as low as possible capacity in the "tank" circuit (C4-L3), and every importance should be attached



NOTICE!
**Kilgariff's
Agencies**
114 Gawler Pl.,
Adelaide
is Sth. Aust. Agent for
**PARCO
PRODUCTS**

RF COILS
IF TRANSFORMERS
B/F OSC. COILS
R.F. CHOKES
HIGH FIDELITY
AUDIO TRANSFORMERS and
MODULATION
TRANSFORMERS

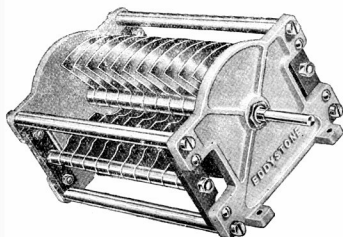
to R2, R3 and C5, which should be exactly as specified. Tuning is straight forward on all bands, and ample excitation is obtained from the "double frequency doubler" stage to excite the 802 on 28 mc.

Next we come to the modulated amplifier or "driver" stage. An 802 was chosen mainly because R.F. excitation is required to fully excite it, which, as everyone knows, is most desirable in the region of 10 and 20 metres. No doubt a 6P6 pentode could be used equally as well with similar results, but with slightly less output on telephony. The 802, whilst operating as a normal R.F. pentode amplifier, requires for maximum output, that the suppressor be at cathode potential or slightly positive. When modulation is applied, the tube must operate under this optimum condition at its instantaneous peak output. For this reason, the suppressor is biased negatively until the R.F. output is one-quarter that to be obtained on modulation peaks. The unmodulated plate efficiency is there-

by reduced to half the normal value and plate current falls to half the normal value. This means, that when modulation is applied to the suppressor grid, at the positive audio peak the instantaneous output is four times the carrier power and plate efficiency rises to a maximum. The average plate efficiency with 100% modulation then varies between the carrier efficiency and peak efficiency, which is about 45%. A characteristic of the 802 is that the R.F. output linearly with variation of suppressor voltage. That is, the plate current remains constant with modulation while power output increases the 50% required for full modulation. In operation, with 500 volts plate supply, the normal plate current will be in the vicinity of 50 m/a. On telephony, this current will be reduced to about 25 m/a. The suppressor bias should be increased to just below a point where the plate current commences to kick when audio voltage is applied, the kick indicating over-modulation.

EDDYSTONE

SHORT WAVE COMPONENTS TRANSMITTING CONDENSERS



Cat. No. 1078.
.0001 mfd., 60/-

Cat. No. 1080.
40 x 40 mfd.
Split Stator, 66/-

7000V. PEAK TYPE.

AVAILABLE FROM SYDNEY'S HAM STORE

PRICE'S RADIO SERVICE
5 and 6 Angel Place, Sydney.

CATALOGUES AVAILABLE FREE.

Transformer coupling between the modulator and the R.F. amplifier is to be desired in preference to resistance-capacity methods. With resistance-capacity coupling, the suppressor cannot be driven positive owing to the high resistance in the circuit. Suppressor current tends to bring about back bias, so reducing output and introducing distortion if an attempt is made to modulate in excess to 70%. Using a transformer, the low suppressor circuit resistance enables the suppressor to be driven sufficiently positive to give 100% modulation without distortion. The transformer should preferably be of fairly large core section, approximately 1in. x 3in., and a ratio of 1.1 or even slightly less. A Class "B" input transformer 53 type, serves the purpose admirably. A 6A6 tube forms an excellent modulator. Its amplification factor is fairly high when used as a triode, so requiring the minimum of speech amplifies equipment. In practice, a 6C6 resistance coupled to the 6A6 is quite sufficient for microphones of the "Reiss" and double-button types. With a good single button type the 6C6 may be dispensed with. A single pole switch is provided for changing over from cw to phone. Filament and high tension switches for the modulator may be wired in if desired.

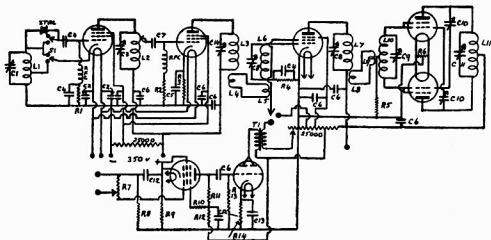
Now we come to the final amplifier, which is quite conventional in every detail, and utilises a pair of 46 tubes with the extra grid tied to its companion control grid, so causing them to operate to an extent as Class "B" boosters. Provision should be made for convenient variation of the excitation to this stage. One method is to mount the pick-up coil from the 802 tank circuit on a movable bracket, so that its relationship to the tank coil may be altered at will. Little difficulty should be met with in adjusting this stage. The neutralising condensers should be of a

good type 5 plate midgets. Neutralisation will be obtained with these about half meshed. A positive indication of neutralisation is indicated by zero plate current with the full high tension applied, but with the excitation removed. For cw operation with 500 volts on the plates, care must be taken to see that too much excitation is not applied, as, with the 802 delivering in the neighbourhood of 12 watts power, the 46's may be driven to draw very high plate current. It is best to start with the link pick-up coil a fair distance from the 802 tank, then tighten the coupling until the desired plate current is obtained to the 46's. This may be increased to 150 m/a. on 20 metres and about 130 m/a on 10 metres. Naturally the tubes will not dissipate this energy continuously, but when keyed handle it nicely and do not over-heat. One pair of 46 tubes in a similar circuit used by the writer served for over twelve months with an input of 550 volts at 200 m/a on 40 and 80 metres.

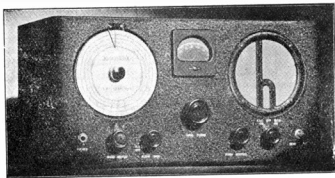
For telephony operation, the 802 should be adjusted as described, and without any alteration to the final amplifier, adjust the link pick-up coil to a position where the plate current to the final amplifier commences to kick slightly on modulation peaks, then increase the coupling ever so slightly until the plate current is again steady. This will probably occur with the plate current between 55 and 60 m/a. At this stage, the antenna current should show a substantial rise on modulation, and with a correctly designed aerial the carrier power will be about 15 watts. Without doubt, this is no more than could be obtained with the 802 as the final amplifier plate modulated, but the cost of a modulator to deliver 15 watts of audio is very much greater than the cost of, in this case, the linear amplifier, and the added advantage is in having a transmitter capable of delivering a good "Sock" on cw.

L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	Freq. Band
10	28	22	2	3	20	20	2	3	20	25	3.5
10	14	14	2	3	13	13	2	3	13	13	7
10	14	6	2	3	5	5	2	3	5	7	14
10	14	3	2	3	2	2	2	3	2	4	28

L1—Tapped 3 turns from grid end; L2, 3, 6 and 17—Wound with 14g. enamel 2in. dia. L4, 5, 8 and 9—Wound with 14g. enamel 1 1/2in. dia. L10—Wound with 1/8in. copper tubing 2 1/2in. inside dia. L11—Wound with 3/8in. copper tubing 1 1/2in. inside dia. For 40 and 20 and 10 metres; 80 metres coil wound with 1/8in. copper tubing.



- | | |
|--------------|-----------------|
| R1. 50000 | C2. .005 |
| R2. 50000 | C3. 21 p midget |
| R3. 1000 | C4. .00025. |
| R4. 40000 | C6. .01. |
| R5. 1000 | C7. .001 mica. |
| R6. 20 C.T. | C8. .00025. |
| R7. 50000 V. | C1. .0005 |
| R8. 50000 | C5. .001 mica. |
| R9. 3000 | C9. .00025. |
| R10. 250000 | C10. 5 p midget |
| R11. 100000 | C11. .00004 |
| R12. 5000 | C12. 4 mfd |
| R13. 50000 | C13. 25 mfd |
| R14. 1000. | C14. .00025 |



Experimenters Operators Listeners!

BUY A
Hallicrafters
(America)
SKYRIDER
COMMUNICATION
RECEIVER
AND END YOUR
TROUBLES!

SKY BUDDY, 5 tubes, tunes from 16 to 550 meters, with built-in speaker and A.C. power pack, 240 volt.

SKY CHAMPION, 8 tubes, 7 to 550 metres, built-in speaker and A.C. power pack.

CHALLENGER II., 9 tubes 7.9 to 550 meters.

SUPER SKYRIDER, 11 tubes, 5 to 550 metres.

SPECIAL SUPER SKYRIDER, 13 tubes, 5 to 550 metres, with two stages preselection.

ULTRA SKYRIDER (tunes in 5 metre stations with same ease as lower frequency signals), 10 metal tubes, tunes 3.75 to 53 metres, direct dial calibrations, unique band spread system, iron core expanding I.F. trans., single signal crystal control.

SPECIAL NEW MODELS—NEW 8-TUBE SUPER SKYRIDER, tunes from 5 to 10 metres only, built-in speaker, etc.

SUPER SKYRIDER MARINE, 8 tubes, built-in speaker, tunes 16 to 2150 meters.

NEW SKYRIDER DIVERSITY, absolutely the latest.

PARTICULARS FROM AUSTRALIAN FACTORY AGENT:

Kilgariff's Agencies

Box 1015J G.P.O. Adelaide
South Australia, F2490

VK3MR DX Notes

The first week-end of the dx contest will be well and truly over by the time these notes are in print and no doubt contest history will be in the making as evidenced by the increasing number of stations being worked in each successive test. Judging by conditions at the time of writing and the wide publicity given to this test by the "Sir John Dunningham" Memorial Contest, it will be the biggest yet held. As soon as the test is completed I would appreciate it very much if you contest fiends would drop me a line with full particulars regarding your score. It will be interesting to observe what affect the troubled times in Europe will have on the number of entries from those countries.

It is well known that the operator of the station plays the biggest part in these tests, but it is gradually becoming known that an efficient aerial is a necessity because what good can the best operator with a perfect transmitter do, if his sigs. are not being received in certain dx countries! The position in the band is most important as it must be known that the world, including the Yanks, are to call VK/ZL and they will call from the ends of the band in an endeavour to get in first, therefore it is to our advantage to get as far away from the edges as possible when calling CQ and only use the edge xtals when calling an individual station. This also lessens the qrm locally and gives everybody a better chance of hearing these edge stations.

Some further antenna experiments have been carried out at 3BM and he has now increased the W Vee beam from 12 half waves per leg to 20, which makes each leg 696 feet long. It would be interesting to find out if there are any longer aerials in VK. While on the subject, it would also be interesting to know who has the highest antenna. VK3GV has one 120 feet high and is situated on the highest part of the country surrounding Melbourne. By increas-

ing the sides of his beam, Bruce finds that the coverage is less although the signals have increased in strength. A maximum of 12 half waves per leg seems to give general coverage when directed on any continent. From observations of the leading stations in all parts of the world the Vee and Rhombic antennas seem to give the best results, although the W8JK beam is the most popular. Seems as if the good old zepp is doomed.

Morry of VN wants to know if anybody has worked WAC in less than 1 hour 50 minutes! Who? Conditions are. . . No skeds! and an added condition must be added in fairness to him . . . with the flu! 2DG has been giving wide publicity to the October test by going all out in the memorial test and has done some real good work in spite of corns or similar appendages on fingers and what he sits upon! Has added four new countries to his long list . . . TF3C, 14400 kc, 110 am.; TA1AA, 14420 kc, 3 pm, and LX1AX, 14435 kc. at 410 pm. The rare stuff, I notice, is still to be found out of the band. Other rare stuff are PY1DS, 14325 kc., 710 pm.; CE3DG, 14400 kc, 520 pm.; LU1EP, 14405 kc., 840 pm.; ZP7AC, 14460 kc., 330 pm.; FM8AA, 14250 kc., 1020 pm.; CR7GF, 14275 kc., 2 am.; K6OVN on 14320 kc. hails from Guam. From midnight onwards a batch of South Africans are there for the staying up and are very easy to contact.

No scores to hand from the 160mx test other than 7AB, who had fourteen contacts. Good hunting for the dx test, chaps.

Your attention is drawn to page 27, wherein there appears an announcement from a New Zealand advertiser, Te Aro Book Depot Ltd., of Wellington, who are able to make a unique offer in regard to Ham literature. It will repay all amateurs to read this advt. carefully.

28 and 56 M.C. Notes

(By A. Pritchard, VK3CP.)

Ten metres has completely returned to life again with DX coming through at any time of the day and night, keeping the lads' interest going. The Europeans have shown up in large numbers and many qso's can be obtained from 7 until 11 p.m. The Africans can be contacted from 4 till 6.30 p.m. during the Sunday late afternoons and ZE1JR and ZE1JZ have very fb phone signals. VK3BQ and 3XP are having the best luck with these stations. I received a very interesting letter from that world famed OM, Eric Trevilcock BERS 195, who is situated at the Telegraph Station, Powell Creek, North Australia. He has been hearing we VK's with good strength and listens every day when not pounding brass for the P.M.G. VK2GQ, 2HF, 3BW, 3CP, 4HR, 4HG and a stack of W's, all put in good phone during daylight hours and on cw VK2FY, 2UD, 4HG, 5IT, 6AF, 6SA and W's also VU2FS in the late evening showing that receiving conditions out in No Man's Land are very good. The rx is a TRF using dry cells for battery supply. This rx is efficient on 5 mx and Eric keeps a schedule with VK2NO for an hour from 11.00 EST each Saturday and Sunday morning. VK2HF had r9 speech testing a new rig. ZE1JJ and ZE1JZ were both heard for an hour on 14th August from 4 p.m. until 5 p.m., showing that receiving conditions are quite similar to those here. K6LCV and K6PCF maintain a steady r9 signal for hours on end, every day and any time from 7 a.m. till 5 p.m. Numbers of K6's calling cq10 show that more VK's and ZL's are needed on 10. Eric has stated that he will keep us in touch with conditions up north in the future, thanks om 73.

VK3XP has had excellent results and a few Sundays back DX started at 4 and finished at 10.30 with ZS6EG, ZE1JZ, ZS1B, ZS3F, SU1CH, VS7MB, all on cw—1JZ on phone; cwVK6SA, G6KS, G2OA; also heard G5LL, G5WH, G5EH, PAOAZ, PAOAF, OK3VA, F8KJ, showing many on the bands. ZL2BT uses 100

watts into a pair of T55, driven by 6L6 doub. and 6L6 co tritet. The final is modulated by a pair of ZB 120's in Class B and link coupled to two half waves in phase on 80. The RX is an 11 tube Hallicrafter; 2BT is on the look out for VK's. On 21st August at 4.40 p.m., 3BQ qso'd VS6EG and Max put over phone receiving the report, r9 on the HRO receiver meter. Also on 28th August at 4.20 p.m., Max again qso'd VS6EG and at 4.40 p.m. heard an r5 phone harmonic from VK6ZO on 20 mx, 6 p.m. ZS3F on cw, ZS1B qso'd at 8 p.m. and ZE1JZ at 569 cw at 8.15 p.m. On Sunday, 4th September, at 7.25 p.m., 3BQ contacted VQ3TOM, showing a new country for 10 metres, but the joke of the evening came with a qso with VS6AO, who was using the harmonic of his 20 mx xmtr. VU2AN first informed VS6AO of his terrific harmonic on 28 mc. 3XP also qso'd the VS6 who was hitting r8 on peaks about 7.45 p.m.

W6NLS has one of the best sigs. here, the antenna systems doing the trick. He is in Little Valley between 5,000 foot hills, an H type beam 55 feet high on VK and a rhombic on South America, a full wave 160 mx atn. for the receiver—plus 1 KW input. W6GSX is using the di-pole reflector director combination and the exact measurements are as follow:—For 28,000 kc, 17 ft. di-pole, 16 ft. 4 1/5 ins. director, 17 ft. 6 4/5 ins. reflector, 15/100 of a wave director spacing, 1/10 wave reflector spacing, giving 60 and 42 inches respectively. The Y matching system of feeding is used, and for a 600 ohm line, 54 inches on each leg of the Y is OK. 6GCX has received r8 reports from all stations contacted and qso'd ZL2BE four hours earlier than other W's. He was the last to fade out here, so this beam with its copper tubes evidently must be the goods and the dimensions halved should make an excellent 5 metre antenna. VK3EH is now on 10 and is getting nice output from a 53, 53 from 80x, 807 buff and PP 809's final modulated by 6L6G's class AB1.

Divisional Notes

To ensure insertion all copy must be in the hands of the Editor not later than the 18th of the monthpreceeding publication.

ZONE 5 NOTES. (VK2IG.)

VK20J.—Busy working European on his beam. Is getting R max from G's by the dozen on fone. That V8 amplifier sure must be going well.

2QE.—Still piling up the quids. What a rig Allan will have when he starts up again.

2AFD.—Has taken to the air. Anyhow he has joined up in VIM. He'll be able to air-taxi the locals around.

2AP.—Bought a new petrol eater, but still has time for his skeds. New gra now and has got to remodel all the xtal sets at the adjoining grammar school, hi!

2IG.—Rebuilding again and still hopes to have super rig going for contests.

2EU.—Still worrying about BFO in supers that don't BFO. Some of u super super experts send him some dope or we won't answer for his actions.

2JA.—Believe a new ham has built his nest here in old 2JA from Wagga. Welcome to Albury, Athol.

2YW.—Not heard so much lately.

2AIB.—Has a small 20 watt rig going on 40 on fone. Complains of the lack of DX.

2AID.—Borrowed a 50 from 2AEO but as he can't get it to draw less than 250 mills is wondering if that's why they call it a 250, hi!

2AEO.—Threatens to break out on 20 any time now. Oh, what qrm there'll be then!

2UO.—The old story. Enthusiasm is lacking at the moment, probably due to the wx. Come on chaps, keep it going, you'll miss the club if it goes off. Nothing has been heard from Coolamon, but we're hoping. Same applies to Canberra, too high hat?

2BW.—Of Junees has got going. When told that there was a 2BW in Wagga one time, replied, "Well, he's a pirate! ! !"

2FQ.—Has the exam results and got good news. Good biz, Doc., now rattle that rig? What sa?

2MP.—Talk of the Scarlet Pimpernell. MP has him beat because his own colleagues don't know where he is.

COALFIELDS NOTES. (By VK2KZ.)

VK2KE.—Very pleased to see you join the W.I.A., have not heard you going as yet, but will do so in a month or so when exams are over.

VK2YO.—Hear you now and again of 14 mc trying fone with W etc., is building a ten tube super for dx, but will be some time yet before ready.

VK2KZ.—Doing very little here at the moment, trying out 8JK beams on 14 mc, but not so good, but continuing with beams hoping to strike one which is suitable as ground area not sufficient to anything big, entering the junior VK-ZL dx contest.

VK2DG.—You will just about win the Sir John Dunningham trophy if I am any judge Keith, good luck. Uses zeppelin and 8JK on Europe, works fine, entering the junior VK-ZL dx contest also.

VK2YL.—Another regular on 14 mc, called you dozen times. Harry when on midday schedule with 30I. Also entering the VK-ZL dx contest.

VK2CW.—Have not heard you yet Bill, yet the 8JK perking and lets hear you, I can't afford to write you all, so please qsp any news.

VK2PZ.—Another who I have not heard yet; are you on 10 metres, using a nice 10 tube super on 10 metres, but rig not on 10 metres yet, qsp any new Chris so as I can keep these notes interesting.

WAVERLEY RADIO CLUB NOTES. (By VK2AHJ.)

The activities of the club members these days are mostly confined to building more and more portable gear for the future field days. These outings are very popular with the gang and apart from being conducive to good fellowship among the members also promote the construction of gear that could be put to good use in emergency operations. The next field day is only a week away and the gear of the portable stations is in the final stages of construction. That being used by 2AFZ, 2AHJ and 2TN is in operation and is powered by accumulator driven dynamotors.

The members were sorry to hear that 2MQ was QRL in hospital and all expressed their wish that Dud would soon be back in circulation.

At the meetings of 9th and 16th August the president, Mr. Wells, ably demonstrated the use of an oscilloscope and by employing the portable transmitter of 2ABS was able to show the members just how complicated a modulated carrier can be. The following weekly meeting 2EG brought forward his version of an oscilloscope and put it into operation, using some dance recordings as victims. Dev's 'scope was certainly a piece of work and the only thing about it that annoyed 2ABS was that he didn't see it.

The meeting on 20th August saw some of the new portable gear in action and 2AFZ (portable) proved itself capable of "getting out." The club would appreciate the co-operation of any "hams" or swl's who happen to hear any of the portable stations in action at any time, and it may be certain that these grp rigs will always be on the lookout for qso's.

On September 6th the introduction of the new club transmitter was discussed and it was decided that the new rig should be adequately protected. Many hours' hard work have gone into the construction of this transmitter and great credit is due to Gordon Wells and Dave Halley on that account. The exciter section of the rig is working quite well now and according to reports, the thermostat frequency control is a huge success.

Col Saunderson is making great steps in learning the code and Bill Stanley is also threatening to take it up seriously. Looks like more grm fellers!

Anyone wishing to disown an 800 should get in touch with 2EG whose week-end dxing is curtailed because of a fatality in 2EG's final.

LAKEEMBA RADIO CLUB.— VK2LR. (Affiliated with the W.I.A.) (By 2DL.)

During the past month several lectures of outstanding interest have been delivered at the Lakemba Club Rooms, "Sunrise Hall," Canterbury. A series of discussions on the use of the oscillograph together with practical demonstrations, were conducted by Messrs. Choules, 2HB, and Martin, while early in September Messrs. Warren, 2QX, and O'Donnell, 2OD, are to conduct a demonstration on "The Process Involved in the Making of Instantaneous Playback Recordings," it being anticipated that an actual recording will be made in the club rooms.

The club membership is fast approaching the 100 mark, and each meeting brings further nominations. Various members are already making arrangements for outings and field days for the forthcoming summer, during which period many interesting hours should be spent with portable apparatus. Inquiries relative to club matters will receive the immediate attention of the secretary, Mr. V. Bennett, 2VA, 14 Park avenue, Concord.

Victorian Division

KEY SECTION.

3ZU.—Will be down on 5mx again soon.

3FR.—Just had a tooth out. Can't think of anything else at the moment.

3QS es 3SQ QRA's now adjoining each other. QS using SQ's feeders?

3UM.—In between rebuilding, working some of the rarer ones in the afternoons.

3ML.—Has new 100 watt 56 mc CC transmitter well under way and when finished will pump power into

a double 260 degrees horizontal rotary beam with directors.

3KR.—Spasmodically active on 3.5 mc, only aims to outdo 3YK as a hiker—did an 8 mile hike during last week-end.

3RX.—Lost a good mast in the recent gales.

3HK.—Active on 14 mc at week-ends with Vee beam (8 half waves) on Europe, but not too good as lower ends too low, but better than old zepp.

3RN.—Just commenced on 14 mc with 6A6 osc-dub, 6L6G dub, and 809 final, working his share of DX.

3IK and 3SK.—Just started and doing ok on 40.

3UX.—Got tangled up with a circular saw. Best wishes for a speedy recovery.

3YP.—Too busy trout fishing to have time for radio.

3CP.—Proud trout fisherman also—one fish.

3BQ.—Also trout fishing—half a one!

U.H.F. SECTION NOTES.

(By 3JO.)

C.C. FOR 56MC.

3OT, 3PS, 3DA and 3YL are now operating with xtal controlled transmitters. The various line-ups are:—
3OT: 40mx xtal, 6A6 osc-dblr, 6L6 dblr, 807 dblr, 807 PA. 3PS: 40mx xtal, 42 osc-dblr, 6V6G quadrupler, 6L6 dblr, 807 PA. 3DA: 40mx xtal, 42 osc-dblr, 6L6G dblr, 6L6 dblr, 807 PA. 3YL: 60mx xtal, 6L6 osc-tripier, 59 dblr, 809 dblr final stage. These line ups show just how necessary is the modern tube to the controlled U.H.F. transmitter. In addition to the change to C.C., 3DA is now using a vertical J type of antenna with a two wire untuned transmission line terminated at a tuned tank circuit which is link coupled to the tank coil of the final stage. The result is an R9 signal at most places (including three B.C.L. receivers) and a big improvement over previous efforts. 3PS, after some feedback troubles, now has PP6L6 mods and is pushing out a very nice sig to most places. 3OT is still using his 6A6 mod. with the new xtal rig, but is talking of P.P. 210's class B. 3YL is also in trouble with the audio channel, but with 6L6G's class B. and P.P. 809's Class C in the wind,

certain 5mx receivers seem to be in danger of burning up.

3JO, 3OG, 3RI, 3YZ, 3YJ are still active and 3LG has also been heard at times while 3GG has left for a trip to U.S.A., but expects to be C.C. when he returns about December. A newcomer to the band is 3HP, a member of the R.I. Department, but he has not been heard very often, contacts to date being 3PS and 3JO, strength here rather weak due mainly to horizontal antenna used for transmission.

FIELD DAY NEWS.

The field day suggested for 27th November will have to be cancelled as the section has been requested to provide four portable stations at various points around a car race track at Wangaratta on 26th November. No details are to hand at present, but the members are looking forward to the trip.

The lecture promised for the October meeting is to be given at the quarterly general meeting on 4th October, while this section will meet as usual on 18th October and in view of the present activity on 56 mc an interesting evening is assured.

WESTERN ZONE.

(VK3HG)

I must apologise for the absence of notes last month, but it is impossible to get news of the doings of the boys as most seem to be either inactive or on 14mc, where it is impossible to contact them. I again appeal to all members in this zone to let me have some news of your activities, either by letter or radio, so these notes can be made interesting and readable.

Our convention will probably be held about the middle of November at Camperdown, the exact date will be announced later.

Conditions have been quite good in the past month, especially on 14 mc, where all continents have been worked. The Europeans who have been coming through very well since May have been a little uncertain lately and are not so easily contacted in the afternoons, but are coming in quite well in the early morning and

Amateur Radio

are easy to work. 28mc is improving too, the W's and South Africans being fairly easy to contact.

3KX.—Still working them in fine style on 20mx phone.

3TW.—Not much heard from Tim lately. Reported to have had an accident recently.

3OW.—Working a few on CW and rebuilding speech for phone work.

3HG.—Visited the Northern Zone and learnt from 3BM how to really work DX! Active in the 160mx contest and working lots of DX on 14mc.

GIPPSLAND NOTES.

(VK3PR-3DG.)

3DG.—Busy with code practice, has two aspirants for next AOPC exam, so whato grm at Stratford if they are successful.

3GO.—Graham must be qrl or is making drastic changes in his rig.

3SS.—Keith cannot get time to erect an ant., but hopes to just make it soon, has put rig in rack and panel.

3XH.—Stan on 80 mx fone so we hear, fb om. Also another hard worked serviceman.

3LY, 3NO.—Local b.c. station keeping them very busy, rebuilding throughout.

3VG.—On 40mx cw and getting his share of contacts.

3QB.—Have not heard Jack for long time, but guess he is still after those elusive few W states for WAS.

3DI.—Jim is active on 40mx at last, still QRP.

3JE.—Bill has forsaken the Eastern Zone for a warmer place—Kynton.

3WE.—Bill trying hard to work W on 3.5 mc fone. Any luck yet, om?

3HZ.—Murray is still waiting for a modulation transformer.

3XZ.—How is the new rig coming on, Mac?

3EA.—Evan is thinking of putting a rig on his boat. Might frighten the fish om, hi!

3PR.—Ron still plugging along working a little dx on 40 mx, also on 80 mx fone. Heard a W calling you on 20 other night, so explain that.

Queensland Division

Conditions during the past month have been more or less "up and down," some days being very good and other days just fair, but on the whole September has been a good DX month to date. We are now entering summer and it is to be hoped that conditions will be at their best for the big October contest.

160 METRE CONTEST.

This contest which was run on the recommendation of VK4 proved a disappointment in one respect; far too few stations were sufficiently energetic to put their rigs on the lowest frequency band we are permitted to use. Conditions were far from the best for the contest and not a single VK6 was contacted by any of the VIB gang. The outright winner looks like being ZL4DQ. In Queensland the positions look like being filled as follow:—4AP, 4HR, 4AW, 4UR. The VK4 Division wishes to express thanks to all who took part in the 160 metre contest.

BRIGHT STAR RADIO —VK3UH

S. A. Rep.

Kilgariff's
Agencies

114 Gawler Pl.
Adelaide

CRYSTALS

Ground from the Best Brazilian Quartz and Tested to 50 watts input to Penthode Oscillator.

Accuracy Plus or Minus 3 Kcs.

160 metre	15/-
80 Metre	10/-
40 Metre	£1/5/-
20 Metre	£2

Plug in Dustproof Holders, 7/6 each.
Satisfaction Guaranteed.

517 LOWER MALVERN ROAD,
GLEN IRIS, S.E.6, Victoria.

Phone, U1218.

VEALLS

1938

Radio

Catalogue

Sixty Big Pages each 11in. x 8½in., containing thousands of items and hundreds of illustrations of Radio Sets, Parts and Accessories . . . everything the keen radio enthusiast desires.

NOW READY!

Write for your copy to-day, merely enclose a 2d. stamp to defray cost of postage and a copy will be sent by return mail.

AMATEUR TRANSMITTERS.—If you hold the A.O.P.C. tell us . . . it's to your advantage. We will record your name on our special list and make regular mailings to you.



VEALLS

6 BIG STORES

Address all letters to
BOX 2135T, G.P.O., MELBOURNE.

490 Elizabeth Street, Melbourne.	— — — — —	F3145.
243 Swanston Street, Melbourne	— — — — —	C3059
168 Swanston Street, Melbourne	— — — — —	C10524
299 Chapel Street, Prahran	— — — — —	Wind. 1605
3-5 Riversdale Road, Camberwell	— — — — —	W1188
97-99 Puckle Street, Moonee Ponds	— — — — —	FU7822

ACTIVITY FOR DX TEST.

The sole topic of conversation among the VK4 transmitting fraternity at the moment is the forthcoming DX Tests. The last ounce is being squeezed out of receivers, a few finals are likely to run red hot judging by the power supplies now on order; beam antennae look like being popular with many contestants. Those who have signified their intention of taking part in the contest include 4GK, 4BB, 4UR, 4UL, 4HR, 4AW, 4EL, 4AP, 4JX, etc. We tip 4JX or 4BB as the highest scoring station in VK4.

PERSONAL ITEMS.

4BB is certainly scoring some successes with his portable TX, W on fone is no mean accomplishment with a mobile outfit.

4UR now using an 8JK beam plus a phased antenna, and putting up another sky wire for the contest.

4HR is our 807 expert—ask 4KH.

4UL is raising the W's very nicely on fone. The modulator uses 6L6's.

4GK certainly believes in loose coupling. The aerial coil is about 2 feet away from the P.A. tank.

4AW has some very interesting dope on 56 mc aeriels. Tests have been carried out with 4WT. Profit by somebody else's experience, om's, and save the pocket book.

4HU is now ok for fine operation. Heard him working break-in with 4AP.

4JX is full of smiles these days. Possibly pleasant reflections on the result of the DX test has something to do with the evident satisfaction.

4JP should be among the place getters in the "Memorial" contest. George has done more to popularise the DX contest than any other VK4. And does JP's fone get out—38 countries in a few weeks is the record.

4HR, 4VJ and 4AP are about the only ones that have used the 28mc band in the last few weeks.

Both city and country members are reminded that the Division's station (VK4WI) is now on the air on Sunday mornings from around 10.30 a.m. on the 7 mc band. The object in running the station is to provide members with items of general interest and students with Morse practice.

4RT will soon be operating on all bands.

VK9VG and friend 9WG intend installing modern commercial transmitting equipment.

South Australian Division

(By VK5KL)

Well, we are drawing close to yet another VK-ZL DX contest and no doubt by the preparation that has taken place it will be a great success.

Although there were only two entrants in the 160 mx contest on 10th September from the State, the usefulness of the band can be realised when it is known that all States in VK were worked and two in New Zealand. VK5 scores were 5KL, 357 points, and 5JT, 288. Tickets are available for the trip to Murray Bridge on Eight Hours' Day, 12th October. A huge gathering of country and city hams is expected.

No interest has been aroused yet for the National Field Day to be held in December, but we are hoping that an increase of entrants will ensure this year's test a greater success than the last.

Conditions have been particularly good on 20 mx the last month, with plenty of Europeans and South Americans audible. Ten metres has picked up and at week-ends 5GF, 5IT, 5ZU, 5KO and occasionally a few others may be heard contacting U.S.A. and South Africa. It seems that once a band has been conquered it stays open! Let's hope that 5 metres will soon produce the same results. There are quite a few prominent and consistent chaps in this State on 20 metres, going each other regularly on sked, with fone, who could quite easily and more beneficially to the progress of amateur radio be doing it on 5 metres. If these fellows who do not belong or come along to the Institute meetings, would come along one night and state their case they would be assured of a sympathetic hearing and it should be possible to make some arrangement to cut down the terrific qrm on 20. A short wave fone transmitters' group might meet the problem (if they all join it would mean a clear night occasionally for CW! But VK3 tried it and it proved very successful.—3RX).

WAKEFIELD ZONE.

(By VK5RE.)

5LR.—Had the pleasure of a visit from Jack recently. Jack brought along 5HD and we had a very pleasant chat. 5LR is keen on 5 metres, so maybe some day Berri and Renmark will QSO on 5.

5HS.—Scotty deserting radio for home movies and at present is trying to do some recording to synchronise with the films. However, he hopes to get along for the Murray Bridge Field Day.

Mr. Lance Catford swatting hard for his ticket and hopes to sit for the October exam. Sure hope you land it Lance O.B. Lance also is a home movie enthusiast.

Ron Green has forsaken wireless for "Monopoly" and at times is quite wealthy.

Harold Fisher recently bought a photo-electric cell and is having a great time with it.

5RE.—Still doing a little radio, mostly Sundays, too cold at night.

Three new members, Mr. K. M. Tucker, Renmark; Mr. H. M. Stacey, Berri, and Mr. A. F. O. Cunningham, Renmark. Will tell you all about them next time.

Wakefield Zone congratulates 5LC on winning both cups in the recent contests. Good work, Les, ob. You will be able to fill up the sideboard soon.

GREY ZONE.

(By VK5PN.)

Pleased to see articles by two members of this zone in the South Australian issue of the mag. It is fair to point out, however, that

VK5LC's article has been somewhat abridged, and though it still is very fine as a history and description of the station, the published version possesses little of the essential substance which weighed so much with the judges when they decided that it was the best article on station equipment suitable for an amateur without mains power. (It will appear as a technical article later.—3RX.)

5TL's article has aroused quite a deal of interest amongst those who contemplate the construction of an emergency portable transmitter.

5WG.—Wally has been very busy with things other than radio for some time, but is now in a position to relax somewhat. He appeals to members in his zone to look out for him and keep him informed of their activities.

Mr. S. W. D. Wilson, of Cummins, is now a member of the W.I.A. He has only to put the finishing touches on his code reception and he will be ready for the exam. Our hope is that we will soon hear him on the air.

As there is a scarcity of news I am going to take the opportunity of informing members that the secretary is anxious to forward membership certificates to all country members who do not already possess one. Please let the secretary know.

BARKER ZONE.

(By 5GW.)

5TW.—Tom is spending his leisure hours on 40 metres. New rack and panel rig being erected. Will be on phone as soon as xtal arrives. By the way, Tom is the holder of a First Class licence.

IT'S STRETCHING THINGS TOO FAR
To expect one Crystal to cope with conditions to-day!

Get that Spare Crystal NOW!

ACCURACY .02%.

3.5 M.C., 20/-; 7 M.C., 30/-;

14 M.C., 40/-.

VK-ZL Contest Specials—165

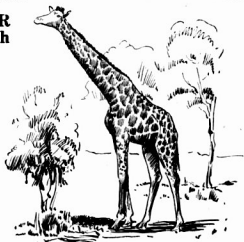
Kc Crystals, 40/-.

Maxwell Howden

(VK8BQ)

CONS. RADIO ENGR.

18 Balwyn Rd., Canterbury,
E.7, Victoria.



Amateur Radio

5BN.—Bad luck, om, when seven tubes went west. Graham appears to be out of action for a while.

5CJ.—Another spot of bad luck, Colin has just returned from hospital. Worked out many fancy ideas while there. We hope to hear some of them soon, om.

5BF.—Nuff sed. We all hear your fb phone.

5BG.—Bob as usual up to standard on phone.

5YL.—Betty was heard on phone in Naracoorte for the first time, very clear but rather weak in this district. Heard telling 5PN that 5XR didn't answer. XR reckons your receiver must have been off.

5PB.—Still bush. Has now grown a beard (some bush).

5XR.—Now on the air with old 40 and 80 rigs rebuilt to suit A.C. 6P6 xtal osc, E406 P.A., 20 watts input to a single wire match imp all band ant. Modulator is 76 driving 2—6L6's tran coupled. 2nd op. Cyril is great on a good rag chew, so watch out for him boys!! (Phooey on 2nd ops.—3RX). Cam put a good R7 sig in ZL on 80 metres.

5GW.—Now on xtal, 3575, 7150 and 14300. Working from 3 band exciter, P.A. not yet coupled up.

Here's hoping to see you all at Murray Bridge for the field day.

Tasmanian Division

(By 7YL.)

The monthly meeting of this division took place on the 13th inst. There was quite a good attendance. The usual business was hurried through. Among the correspondence was a note from 7AB to the effect that he had undertaken the position of recording secretary for the Northern Zone.

A very enjoyable lecture was then given by Mr. R. Shorthouse, his subject being "Principles of Aviation." This young member of the Institute is a proficient pilot and has the subject at his fingertips, explaining some of the technical details of aeroplane construction very clearly and also giving us a brief description of the

6, 12, 32, 110 VOLTS D.C. INPUT INTO A KINGSLEY POWER BOX

will give you

100 WATTS, OF 230 VOLTS, 50 CYCLE A.C. OUTPUT

EFFICIENT ——— SIMPLE.

Think what you can do with this Power—

RUN A TRANSMITTER;

**RUN A KINGSLEY HIGH-FIDELITY RECEIVER, POWER-BATTERY SUPPLY; OR
HOME LIGHTING.**

**We Build TRANSMITTERS, COMMUNICATION RECEIVERS,
AMPLIFIERS, COILS, INTERMEDIATES.**

KINGSLEY RADIO PTY. LTD.

316 LITTLE COLLINS STREET, MELBOURNE.

Factory: 247-251 Spring Street, Melbourne. Cent. 8461.

art of taking off, landing and stunting. It was suggested that one of we hams should take up a 5 mx xmtr and give a running description for the benefit of 200 mx listeners. Everyone then commenced to expound why he (yes and she too) should be chosen to give the running description. Aspirants had better get in a spot of practice!! hi.

Scandal:—

7AH.—We are all glad that "Pop" is enjoying the best of health this winter, and has not missed one meeting this year.

7CT.—Has purchased a Morris Minor—has used up several spools of film taking fotos of it.

7DH.—Recently sat for his "B" Class ticket—should know results in a few weeks; best of luck, Dave.

7KV.—Keith has had an attack of what he calls "dog's disease," but we're pleased to say is quite OK again.

7AL.—Purchased a new Ford V8 quite lately and hasn't very much time (or money) for radio.

7JB.—Working a little DX on Sunday afternoons. For the benefit of a Scotch lass, worked a GM on fone one Sunday afternoon—R8 both ends and very fb. This is not one of "this week's tall ones."

7RK.—Fairly active on 20 mx. In between times does a "Bing Crosby" act on his new guitar. How could you Ray?

7LZ and 7KR.—Both heard quite consistently on the 14 mc band.

7AB.—Has quite a collection of trophies scattered about his gra now, according to 7CT.

7RZ.—Is evidently taking an interest in the current contest as had to apply for more log sheets. Is shortly taking up residence in VK2.

7CL.—Finding DX quite good lately—worked an LU4 and G1 on fone last week. Is at present teaching at the Devbnport High School.

7YL.—Has prospects of getting an 800 in the near future.

73's, JOY.

TE ARO BOOK DEPOT LTD.

64 Courtenay Place, Wellington, N.Z.

(N.Z.'s Leading Radio Bookshop)

Sole N.Z. distributors of "Radio" Monthly (a popular "Ham" magazine, 2/2 per copy, or 19/6 annual sub. posted.

Other "Radio" publications stocked are:—

Frank Jones' "Radio Handbook," 1938 8/-. 1937 6/-.

Frank Jones' "Antenna Handbook," 1938 3/6, 1937 2/6.

Frank Jones' "Amateur Radio Telephony," 5/6.

Frank Jones' "Radio Digest" (bi-monthly), 2/- per copy.

Frank Jones' "Radio Amateur Newcomer," 2/-.

Frank Jones' "Radio Noise Reduction," 2/6.

Send for our list of other "Ham" publications and compare our prices with Australian charges. You will save money. New stocks by every overseas mail.

We can start your "Radio" annual sub. with November, 1937, issue if desired.

The reason for our increasing Australian business is obvious.

The 29a now has a Big Brother!!

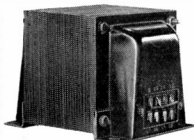
The 30 watt Universal Modulation Transformer (TA29A) that we announced two months ago was so well received and performed so efficiently at inputs in excess of its rating, that we decided to make a job with a 100 watt capacity. The 29A weighs 13 lbs., and VK3BQ assures us it "handles 60 watts with ease."



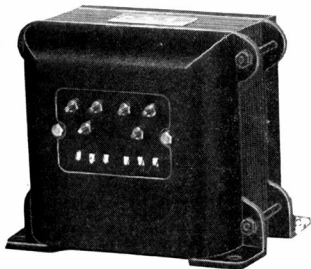
TA 69

transformer. The type number is TA69, and it will couple push-pull 45's, 46's, 2A3's or similar type tubes to 6L6's in AB1 or AB2, 800's, 801's or 809's in Class B.

When building a new speech amplifier, it is logical to terminate the lay-out at the driver tubes. One of these units with a set of our Universal Driver and Modulation transformers will match the driver to any type of modulator tubes available, and will match any modulator to Class C stage, because of the large range of impedance ratios available.



TA729a



TA 74

These transformers will still be doing a good job 10 years from now. May we quote you

Harry Cliff, VK3HC.

MANUFACTURED BY

TRIMAX TRANSFORMERS
(A DIVISION OF CLIFF & BUNTING PTY. LTD.)

29-35 FLEMINGTON ROAD, NORTH MELBOURNE.
PHONES—F1346, F2550.

Hamads

BRIGHT STAR RADIO, VK3UH,
517 Lower Malvern Rd., Glen Iris,
S.E.6.

Crystals ground from best Brazilian quartz and tested to 50 watts input to penthode oscillator, as used by leading experimenters and DX stations throughout Australia; accuracy plus or minus 3 KC's.

160 Metre	15/-
80 Metre	10/-
40 Metre	£1/5/-
465 KC Xtal Gates	23

Power transformers constructed to specifications. Receivers and Transmitters constructed.

Triad first quality 866 mercury vapour Rectifiers, 7,500 volts peak, 17/6; National type N Dials, £2 each; Taylor T20 Triode transmitting tubes, 20 watts plate dissipation, 42 watts RF output, price 25/- each.

Taylor T55 Triode Transmitting Tubes, £3/10/- each.

Call or write above address.

Phone U1218.

Satisfaction guaranteed.

CHASSIS COVERS in sprayed steel or aluminium, also Relay Racks built to specifications. Transmitter Name Plates in Ivorine, Brass or Chromium Plated. Phone B5056. Write or call to CHAS. HANDFORD, 13-15 Mary st., BRISBANE.

CITIZEN Air Force Vacancy.—No. 21, City of Melbourne Squadron has 2 vacancies for W/T. operators. Apply Sgt. Clarke, Drill Hall, North Melbourne, Wednesday evenings.

XTALS by W9ADN, BT cuts, 3.5 mc, 20/-; 7mc, 22/6; XTAL MOUNTS, American, 8/6; R.F. CHOKES, 10/200 mx, 200 ma, 2/6; 5MX, 1/11; BUGS, VIBRO PATTERN, nickel plated, enamelled steel base, last lifetime, over 50 in use in Telegraph Branch, Melbourne, 35/-, plus postage; KEYS, P.O. pattern, nickel plated, 14/6, plus postage. VK3RJ, 23 Landale st., Box Hill, Vic.

**WE CAN SUPPLY
EVERYTHING FOR
HAMS!!**

EDDYSTONE PRODUCTS.

"ABAC" PRODUCTS.

QUARTZ CRYSTAL CO. (England) PRODUCTS.

CRYSTAL MICROPHONES,
£4/11/6 nett.

MORSE KEYS.

METERS.

AND ALL GENERAL LINES

AT

**SPECIAL PRICES TO
HAMS.**

Arriving Shortly

HYTRON TRANSMITTING
TUBES.

**P. & L. WIRELESS
SUPPLIES
PTY. LTD.**

NEW ADDRESS:

213 Elizabeth Street
(Opp. Post Office). F4323.

Radiotron 902

2-inch Cathode Tube

This new release provides at a reasonable price the ideal means for checking modulation and waveform. The 902 requires only 400-600 volts supply and the deflection sensitivity is high.

Special Features

Octal base (same connections as 913).

Medium Persistence Screen.

Electrostatic deflection

Maximum diameter $2\frac{1}{16}$ ".

Maximum overall length $7\frac{5}{8}$ ".

Price £2/15/- nett

RADIOTRONS

The World's Standard Valves

